河北省滹沱河冲积平原地下水质量及污染特征研究

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中文摘要:地下水是河北省滹沱河冲积平原主要工农业及生活用水水源，地下水质量状况直接影响到区内居民的日常生活。为阐明人类活动影响下该区地下水质量状况，本次研究共采集了482组地下水样品进行测试分析，测试指标包含了无机常规指标以及挥发、半挥发性有机指标，共64项。利用改进的模糊数学综合评价法，评价结果显示: 超III类水样点占到总取样点的21.5%，主要分布在工业聚集区和排污河流两侧，且冲洪积扇轴部水质明显劣于中部和扇缘地带。影响地下水质量的主要为常规无机组分，如溶解性总固体、总硬度、铁、锰、硝酸盐氮等，有机组分超标点较少，检出率较高的组分为三氯甲烷、四氯化碳、四氯乙烯和邻二氯苯等，利用EPI Suite软件计算可知高检出组分GUS值均较高，有较高的一致性。对地下水化学指标检出和超标因素进行分析，得出原生水文地质环境和人类活动影响是造成毒性金属、三氮、有机检出和超标的重要因素。

中文关键词:水文地质 地下水 模糊数学 质量评价 滹沱河平原 污染因素

Groundwater Quality and Contamination Characteristics in the Hutuo River Plain Area, Hebei Province

Abstract:As the main industrial, agricultural, and drinking water source in the Hutuo River alluvial plain area, Hebei Province, the groundwater has a direct bearing on the residents' daily life. In order to investigate the groundwater quality under the influence of human activities in this area, the authors collected 482 groundwater samples for tests and analyses. The evaluation using the improved fuzzy mathematics evaluation method shows that the samples whose quality exceeds grade III account for 21.5% of the total samples, and they are mainly distributed in the industry concentration area and on both sides of the sewage disposal river. Furthermore, the water quality in the alluvial-proluvial fan axle area is even worse than that in the middle and rim areas. The factors that mainly affect the water quality are the inorganic matters such as the total dissolved solid, total hardness, iron, manganese, and nitrate nitrogen. The organic matters with high detection rate include chloroform, carbon tetrachloride, carbon dichloride, ortho-dichlorobenzene etc. Computation with EPI Suite software shows that the GUS value of the component with high detection rate is comparatively high and the value has high consistency. Based on an analysis of the chemical component detection and the exceeding-standard factors of the groundwater, the authors found that the primary hydrogeological environment and the effects of the human activities are the important factors leading to the detection and exceeding-standard phenomenon of the toxic metals, trichlorine, and organic matters.

keywords:hydrogeology groundwater fuzzy mathematics quality evaluation Hutuo River plain pollution factor

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